# VITALSIGNS

## INDIANA

**Business leaders in Indiana have sounded an alarm.** They cannot find the science, technology, engineering and mathematics (STEM) talent they need to stay competitive. Students' lagging performance in K–12 is a critical reason why.

To address this challenge, Indiana is raising the bar. The state has joined 44 others in adopting high math standards for K–12—the Common Core State Standards—and is working with other states to create rigorous assessments aligned to those standards. These are promising steps, but the state must do more to succeed amid profound political, practical and financial challenges.

Indiana will need to ensure that schools and students have opportunities to meet higher expectations. Students have made progress in math over the past decade. Yet not enough students—least of all minorities—get the chance to learn challenging content that prepares them for college and careers. Gender disparities are also troubling: Eighth-grade boys outperform girls in science, and women earn about a fourth of college certificates and degrees in STEM fields. Nearly two-thirds of Indiana community college students require remediation in math, costing the state millions of dollars.

To its credit, the state stretches its math and science education dollar farther than other states do. Smart investments will be critical as business leaders work with educators and states to tackle new reforms in lean times.

### STEM SKILLS ARE IN DEMAND

In Indiana, STEM skills have stayed in demand even through the economic downturn.

**STEM:**
**2.4 jobs** for every
**1 unemployed person**


**Non-STEM:**
**5.0 unemployed people** for every **1 job**


# CAN INDIANA MEET THE DEMAND FOR STEM SKILLS?

Students have made real academic strides in most states, but no state is on track to getting all students the STEM skills they need to succeed in college and careers. Low-income and minority students lag farthest behind.

## Students have improved in math

Since 2003, eighth graders in Indiana have made some gains on the National Assessment of Educational Progress (NAEP), also known as "the nation's report card." Yet most still have far to go to reach a score of 299, NAEP's cutoff for "Proficient" performance.

**8th Grade NAEP scale scores, 2003 & 2011**

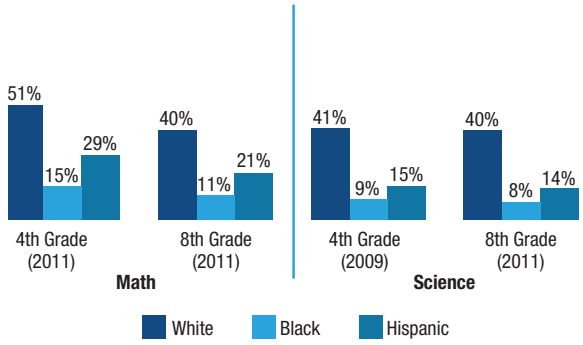
| | NAEP Scale Score | | Change Since 2003 | |
|---|---|---|---|---|
| | 2003 | 2011 | IN | Most Improved State |
| **All** | 281 | 285 | **+4** | +17 (DC) |
| **Low Income** | 225 | 242 | **+7** | +19 (MA) |
| **White** | 286 | 290 | **+3** | +17 (HI) |
| **Black** | 251 | 264 | **+13** | +19 (NJ) |
| **Hispanic** | 261 | 275 | **+14** | +24 (AR) |

*Totals may not sum due to rounding errors.*

## Closing achievement gaps must remain a priority

No state has closed the persistent achievement gaps among racial and ethnic groups.

**Percentage of students in Indiana scoring at or above proficient in math and science, 2009 & 2011**

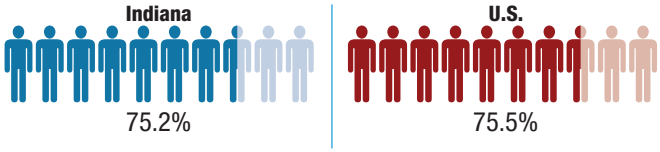



CHANGE THE EQUATION™ IN PARTNERSHIP WITH the American Institutes for Research.

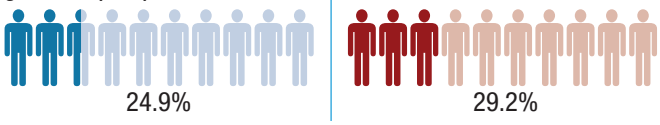
*For the complete state report, methodology, and sources, visit changetheequation.org/stem-vital-signs.*

## Indiana must plug gaps in the STEM pipeline from high school through college

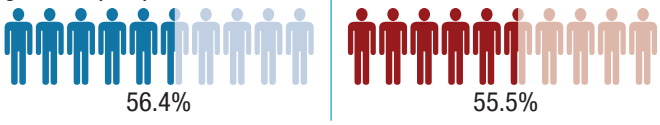
**What percentage of high school students graduate? (2009)**



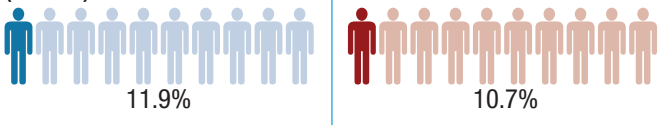

**Of students who enter a two-year degree program, what percentage graduate? (2009)**




**Of students who enter a four-year degree program, what percentage graduate? (2009)**




**What percentage of college degrees and certificates are in STEM fields? (2008–09)**



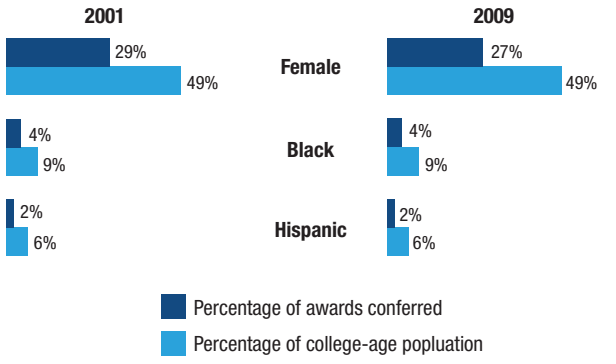

## No student should need remediation

**64%** of Indiana's first-time community college students who just graduated from high school need remediation in math, which costs the state **$16,225,502** each year.

## Women and minorities are too critical a resource to remain untapped

Women and minorities are a very large share of the population but they earn just a small share of STEM degrees and certificates.

**Percentage of degrees/certificates conferred in STEM fields in Indiana**




# WILL INDIANA STAND FIRM ON HIGH EXPECTATIONS?

Setting high expectations is a critical step toward raising student performance in STEM.

## Indiana is showing a commitment to high expectations

Indiana has joined **44 other states in adopting Common Core State Standards** in math. Indiana is also working with other states on common math tests to gauge students' mastery of those standards.

## Common standards and tests in math could be a game changer

Indiana used to set a low bar for students in math, but common standards and tests may change that. In 2009, Indiana's bar for proficiency on its 4th- and 8th- grade math tests was somewhat higher than where the National Assessment of Educational Progress (NAEP) set the bar for merely "Basic" performance.

As **states adopt common tests aligned to the Common Core,** they will also have to **set a common high passing score** or threaten the credibility of the entire common standards enterprise. As the bar goes up, the rate of Indiana students passing the tests may plummet. Indiana **leaders will have to stand strong** on high expectations, even in the face of pressure to back down.

Of course, even the best standards and tests may fall flat if Indiana does not ensure they are well implemented with supports like strong curriculum, teaching materials and professional development. The state should offer clear and regular public updates on its implementation efforts.

## Science is the next frontier for better standards and higher expectations

Twenty-six states, including Indiana, are collaborating on common **"Next Generation" content standards in science,** which they aim to complete in 2013. If these standards meet a high bar, Indiana should adopt them or standards as rigorous.

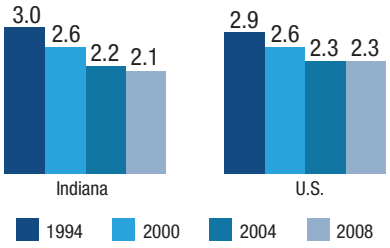
# ARE STUDENTS EXPOSED TO CHALLENGING AND ENGAGING CONTENT?

Lack of access to such content severely limits young people's college and career prospects.

## Building a strong foundation in science takes time

Time for science in Indiana elementary schools has fallen since 1994.

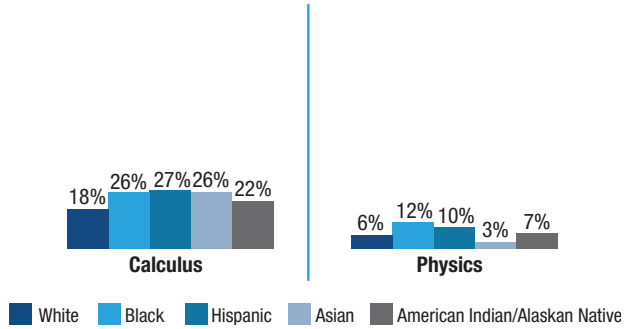
**Hours per week spent on science in grades 1–4, 1994–2008**

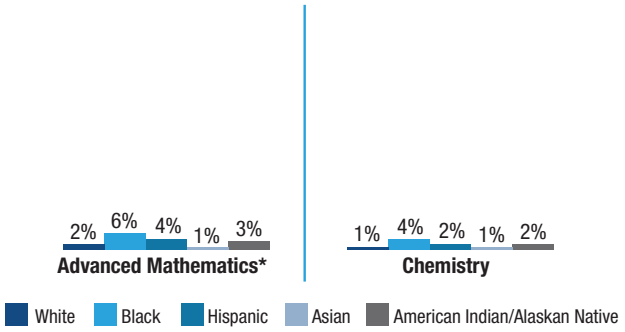



## Students of all backgrounds need access to challenging math and science courses

Nationwide, many minority students lack access to such courses.

**Percentage of students in schools that do not offer challenging math and science courses, by race/ethnicity, 2009**



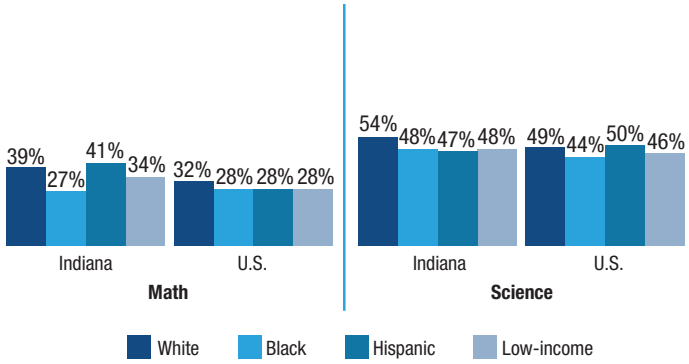

** Includes trigonometry, elementary analysis, analytic geometry, statistics, and precalculus*

# ARE TEACHERS PREPARED TO TEACH TO HIGH STANDARDS?

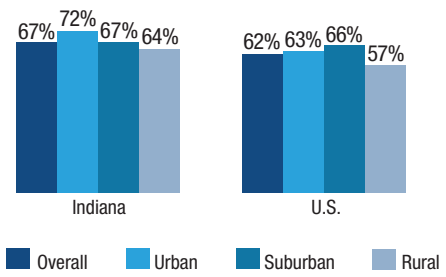
Research shows that teachers' content knowledge and teaching experience can affect student performance.

## Teachers need deep content knowledge

**8th graders whose teachers have an undergraduate major in the subject they teach, 2011**



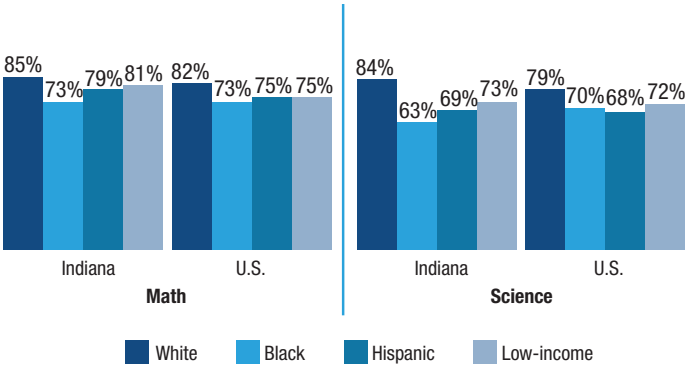

**8th graders whose science teachers took three or more advanced science courses in college, 2011**




## High-need schools need to retain excellent teachers

In most states, minority and low-income students are more likely to have inexperienced teachers, indicating high turnover rates.

**8th graders whose teachers have 5+ years of experience teaching their subject, 2011**



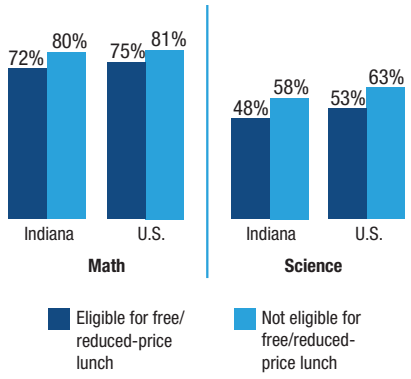

** Reporting standards not met.*

*For the complete state report, methodology, and sources, visit changetheequation.org/stem-vital-signs.*

# DO SCHOOLS AND TEACHERS IN INDIANA HAVE WHAT THEY NEED TO SUCCEED?

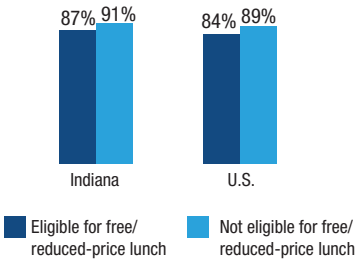
## Teachers need the tools of their trade

**8th graders whose teachers say they have all or most of the resources they need, by income, 2011**



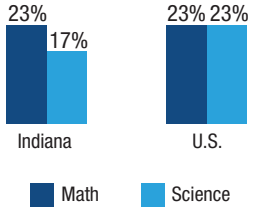

## All students need access to science facilities and supplies

**8th graders whose schools have science labs, by income, 2011**




## Parent support and engagement are critical to student success

**Teachers who say lack of support is a serious problem, 2011**

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# RECOMMENDATIONS

Impatience is a virtue when it takes data and real solutions as its guides. The time to act is now. These Vital Signs provide business, education, state and policy leaders with an extensive and reliable set of indicators to promote STEM learning and high expectations for all students. We've crunched the numbers to offer insights into much-needed actions that can be undertaken right away with resolve.

### Make science count

Indiana tests students in science, but it only holds schools accountable for meeting student performance targets on reading and math tests. Science should count, too. When there are no consequences for science achievement, schools can easily give science short shrift. The time Indiana's elementary schools devote to science has declined steeply in the past two decades.

### Light students' fires

At a time when STEM jobs are plentiful, the number of students earning STEM degrees and certificates in Indiana has not kept pace with demand. Women and Hispanics in particular remain woefully underrepresented in STEM fields. One way to inspire greater interest in STEM is to support out-of-school programs that give students real-world exposure to STEM work. Indiana can also promote initiatives that educate young people—especially those who are underrepresented in STEM fields—about the social and financial benefits STEM careers.

### Improve teacher preparation and support

Indiana needs more teachers with a strong background in STEM content and pedagogy, particularly in math. Strategies include requiring teachers to demonstrate a stronger grasp of content while broadening the supply of teachers who can clear the higher hurdles. Indiana should create more pathways into teaching for STEM majors in college or STEM professionals who are interested in teaching. The state should also strengthen incentives to attract and retain such teachers for the schools that need them most—often in low-income communities.

Current teachers must receive excellent professional development, especially as new math and science standards take effect. Rather than reporting on the amount of professional development teachers receive, states should measure and report on its quality.